

8 | OPERATION AND MAINTENANCE PROGRAM

WATER DEPARTMENT GENERAL INFORMATION

The City of Kent Water Department's current mailing address and phone number is as follows.

City of Kent Water Department Mailing Address: 220 4th Avenue South
Kent, Washington 98032-5895
Phone: (253) 856-5600
Fax: (253) 856-6600

City of Kent Water Department's Site Address: City of Kent Water Department
5821 South 240th
Kent, Washington 98032-5895

State Department of Health Identification Number: 381501

State Department of Health Contact Person: Ms. Brietta Carter, P.E.
State Department of Health
20425 72nd Avenue South
Bldg. 2, Suite 310
Kent, Washington 98032-2358
(253) 395-6770

State Department of Health After Business Hours Hotline: 1 (877) 481-4901
(Weekends, Evenings, Holidays)

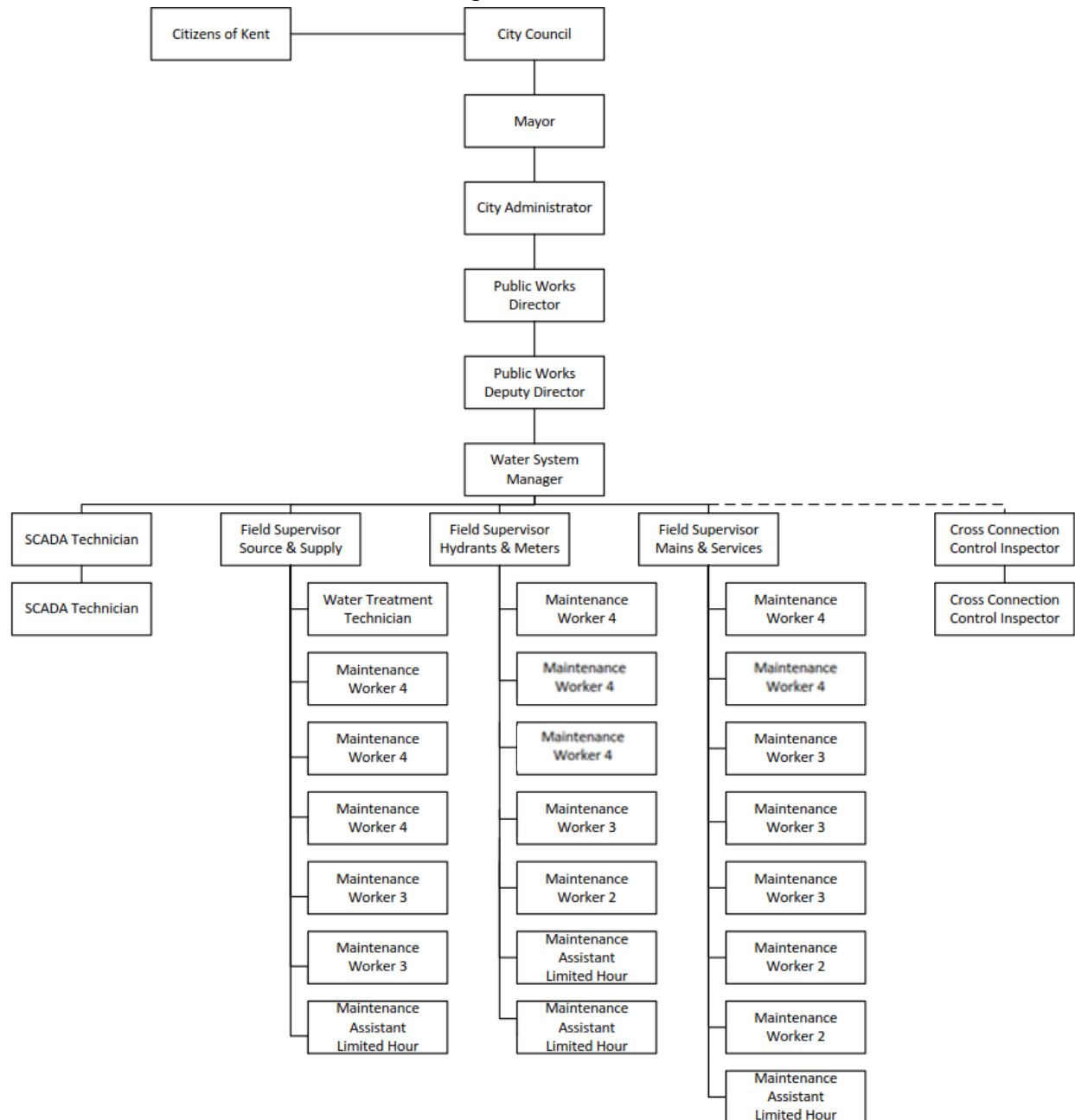
WATER SYSTEM ORGANIZATION, MANAGEMENT, AND PERSONNEL

The City of Kent (City) is a municipality organized with an elected mayor/council type of government. Overall City management, including Public Works, is provided by a City Operations Manager who acts under the direction of the Mayor and City Council. The Public Works Director manages the entire Public Works Department, including an Engineering Division that provides support to all of the Public Works divisions. A Public Works Operations Manager oversees the operation of the Public Works Maintenance Division, which includes the Water Department. The water system is operated and maintained under the direct supervision of a Water System Manager, who holds the Water Distribution Manager 4 certification required by the Washington State Department of Health (DOH).

The Water System Manager and Public Works Deputy Director/Operations Manager handle the routine management decisions for the Water Department. The Public Works Director is involved with all decisions of a significant nature, including the planning for future needs. All major policy decisions and capital requests are reviewed and approved by the Mayor/City Council/Operations Manager. The following sections identify functions in the City Water Department, and an asterisk (*) denotes specifically qualified and licensed/certified personnel

necessary for water system operation in accordance with the requirements of DOH. **Figure 8-1** presents an organizational chart of the internal organization of the Water Department.

Figure 8-1
City of Kent Water Department
Organization Chart



NORMAL DAY TO DAY OPERATIONS

Management, supervision, and direction is provided by the Water System Manager.* The Field Supervisors implement and follow through on the planned schedules for operation and maintenance of the water system, and implement emergency repairs under the direction of the Water System Manager. Routine repair needs are often requested or reported by customers or citizens of Kent, by meter reader personnel, or by other City staff; and are prioritized and merged with the work schedules by the Field Supervisors* for their specific areas of responsibility. The Water System Manager is required to hold a State of Washington Water Distribution Manager 4 (WDM 4) certification.

PREVENTATIVE MAINTENANCE

Weekly work schedules and personnel assignments are prepared by the Field Supervisors* and reviewed with the Water System Manager. Ongoing preventative maintenance programs are improved upon continuously by the field personnel, along with new programs, under the direction of the Field Supervisors and the Water System Manager. The implementation of an Infrastructure Management System (Cityworks) is in progress and will be used to track system component inventory, record maintenance history, produce preventative maintenance work schedules, and predict expected life for the water system infrastructure.

FIELD ENGINEERING

Three technical groups support the engineering needs of the water system. The general areas of responsibility are identified in the sections that follow and are shown with the group that normally handles the work in that area.

Consulting Engineers*

Consulting engineers are typically retained to perform specialized studies related to the water system, such as this Water System Plan (WSP). They also are retained for specialized design, planning, and construction needs such as water quality studies and system planning, water storage reservoirs, treatment systems, pump stations, hydraulic analyses, and structural improvements. Consulting engineers are considered Engineer of Record on many of the City's projects, and as such, are required to be registered as Professional Engineers in the State of Washington in the specific engineering application that is required for a given project.

Public Works Operations Engineers*

The City of Kent's Public Works Operations Engineers typically are registered Professional Engineers. These individuals typically are responsible for specialized projects and smaller design and construction needs that do not require assistance from outside consultants. These include completion of water treatment and distribution project management, water system construction standards, construction plan review, Geographic Information System (GIS) conversion and implementation, water system planning, and capital project coordination.

Public Works Engineering*

Employees of the Public Works Engineering group normally design and manage distribution water system projects, and manage developer improvements to the water system, water tank painting and structural improvements, water main replacements, and construction standards. A variety of certifications are applicable to this category of Public Works staff, primarily registered Professional Engineers.

WATER QUALITY MONITORING

Daily system monitoring of water quality and the required water system monitoring is performed by the Water Source and Supply Staff of the Water Department, under the direction of the Water System Manager, a WDM 4 in compliance with DOH requirements. Water treatment plant operation is performed by Water Treatment Plant Operator 2 (WTPO-2) certified personnel,* as required by DOH, under the direction of the Water System Manager. In-house staff performs most routine water analysis functions daily, and a State-certified contract laboratory is used for compliance monitoring requirements.

EMERGENCY RESPONSE

This section provides a brief overview of the key staff responsible for emergency response as it relates to the water system. The City maintains a comprehensive City-wide emergency response plan that is used in the event of an emergency. The emergency contact list is located in the Water Facilities Control Center at 5821 S. 240th Street, Kent, Washington 98032. Additional information of the basic elements of that plan is provided later in this chapter. The water system emergency response program itself is classified as a confidential document due to the critical nature of maintaining water system security as a matter of practicality, and in accordance with the Homeland Security Act.

After Hours Emergency Personnel

The Water System Manager is on-call at all times, available by telephone 24 hours a day. The City's Police Department maintains call-out lists of all Water Department personnel, as well as procedures for contacting them during emergencies or for customer complaints. Two Water Department personnel are normally on 24 hour standby duty, with cell phones and a City vehicle available for use after hours, on weekends during the higher demand months, and on holidays.

Normal Working Hours Emergency Personnel

Most emergencies during normal working hours are routed through Administration Staff for prioritization and dispatch to field crews. The Water Control Center monitors the Master Supervisory Control and Data Acquisition (SCADA) terminal and monitors the water system operation, under the direction of the Water System Manager. Major City emergencies are managed by the City Emergency Operations Committee (EOC) and the Kent Fire Department, and coordinated with the Water Department and other utilities through the Public Works DOC.

CROSS-CONNECTION CONTROL PERSONNEL

The City's Cross-Connection Control (CCC) program is managed by a designated Cross Connection Control Inspector* (CCS-1) under the supervision of the Water System Manager. All Water Department personnel classified as Maintenance Worker 3 and above are required to be CCS-1 certified to assist with water system protection and implementation of the program.

IMPLEMENTATION OF THE IMPROVEMENT PROGRAM

Improvements are jointly planned, budgeted, and prioritized by personnel of the Engineering and Operations divisions of the Public Works Department. Once developed, the annual budget is submitted to the Public Works Department for review and approval, and to the Mayor and City Council for adoption. Overall implementation is the responsibility of the Public Works Director or designee, who assigns specific elements thereof to the City Engineer or Operations Manager.

BUDGET FORMULATION

Field crews and Field Supervisors prepare and submit operating budget and capital budget requests to the Water System Manager, who prioritizes requests and adds capital improvements, reviews them with the Public Works Operations Manager, and submits them to the Public Works Director for review and approval. Final approval is given by the City Operations Manager, Mayor, and City Council. The Water Department rate structure and debt service is managed by the Public Works Director and staff, as well as the City Finance Department.

RESPONSE TO COMPLAINTS

Complaints are recorded by office staff and routed to the Water System Manager or Field Supervisors for follow up or crew dispatch in a timely manner. Follow-up results are reviewed by the Water System Manager and recorded by office staff. An Infrastructure Management System Customer Service module is used to provide better complaint tracking and more effective response.

PUBLIC PRESS CONTACT

All press-related releases related to the Water System are generally routed to the Water System Manager, and reviewed with the Public Works Operations Manager and the Public Works Director.

BILLING

Water customers' billing and meter reading is managed by the Utility Billing division of the Finance Department.

PERSONNEL CERTIFICATIONS

DOH requires State certifications for individuals responsible for certain aspects of water system management and operation. The City associates State certifications with specific job classifications as follows:

- Water System Management – Water Distribution Manager 4
- Water Treatment Plant Supervision – WTPO-2
- Water Treatment Plant Operation – WTPO-1
- Cross-Connection Control Program – CCS-1

The City has on staff the personnel to meet or exceed those requirements and requires DOH certification of all tenured water operations and maintenance personnel. This is achieved by sponsoring personnel attendance at appropriate safety and technical seminars to encourage advancements and compliance with the professional growth required. **Table 8-1** provides a listing of current certifications held by City staff members, and those required by DOH for this water system as indicated by an asterisk (*).

Table 8-1
Employee Certification

Certification	Number of Certified Personnel
BAT - Backflow Assembly Tester	1
*CCS 1 - Cross-Connection Specialist 1	24
WDMIT - Water Distribution Manager in Training	0
WDM1 - Water Distribution Manager 1	6
WDM2 - Water Distribution Manager 2	13
WDM3 - Water Distribution Manager 3	5
*WDM4 - Water Distribution Manager 4	1
WDS - Water Distribution Specialist	10
WTPOIT - Water Treatment Plant Operator in Training	4
*WTPO1 - Water Treatment Plant Operator 1	5
*WTPO2 - Water Treatment Plant Operator 2	2
WTPO3 - Water Treatment Plant Operator 3	2
WTPO4 - Water Treatment Plant Operator 4	1

SAFETY PROCEDURES

Employees of the City's Water Department adhere to all relevant Occupational Safety and Health Administration (OSHA)/Washington Industrial Safety and Health Act (WISHA) safety requirements, and follow procedures that meet or exceed those requirements (i.e., lock out/tag

out for pump station repairs and maintenance). Regular training of employees during safety meetings and tailgate meetings ensures that all employees are reminded of current safety policies and procedures.

Areas of potential work place hazards that have been identified by Water Department personnel are as follows:

- Confined space hazards – primarily atmospheric or oxygen deficiency
- Electrical, mechanical, and energy hazards
- Hazardous chemicals and materials
- Asbestos pipe hazards
- Fall hazards
- Excavation hazards
- Equipment operation hazards

The City has compiled programs to ensure the safety of its employees and citizens in each of the areas above. The employees are thoroughly trained in each of the safety programs as they apply to their job duties, and there are daily safety tailgate meetings with crews held by Field Supervisors to review specific safety procedures for the scheduled tasks and assignments. The department crews meet together monthly for mandatory safety training organized and coordinated by the Safety Committee, made up of representatives from each department. The committee also regularly inspects facilities and maintenance practices, as well as investigating incidents and accidents, to aggressively reduce workplace accidents and injuries of employees. First aid training is required for all employees, and first aid equipment (ten unit packs) are maintained in all vehicles and at major facilities. Emergency services (911) is called whenever needed for medical aid.

ROUTINE SYSTEM OPERATION

The following presents a schedule of inspection and maintenance for major water system components within the City's water system. Detailed information regarding specific facilities and equipment is not presented herein and is contained in Operation and Maintenance manuals.

WELLS AND SPRINGS

Well and spring source facilities are exercised regularly to maintain reliability when not in use. Disinfection and bacteriological analyses are performed after long periods of inactivity or following rehabilitation work on the source facilities. When online, local programmable logic controller (PLC) or remote (SCADA) controls start and stop the pumps as needed based on reservoir levels or system pressure.

PUMP STATIONS

Pumps alternate on and off regularly, usually every 24 hours, to provide exercise and maintain maximum reliability. Local controls (or remote SCADA control) start and stop the pumps as needed based on system pressures or reservoir levels.

RESERVOIRS

Reservoirs are monitored regularly for chlorine residuals, daily or weekly, to ensure frequent water turnover and avoid stagnation. Pump start and stop setpoints are set to ensure frequent water level cycling. Reservoirs that are drained for maintenance or repairs are cleaned, disinfected, and sampled for bacteriological or volatile organic compounds (VOCs) before being returned to service, following American Water Works Association (AWWA) Standards.

METER READING

Source, pump station, and reservoir meters are read each weekday on a regular schedule when online. The Water Department plans to implement remote totalizer reading with its new SCADA system in the near future, which will allow for system-wide totals to be obtained at a preset time, even on weekends and holidays. This will allow for better recordkeeping of production and demand, and enhance daily demand planning during peak periods.

SYSTEM PERFORMANCE

The overall performance of the water system is monitored by two critical parameters:

- **Water Quality Reliability** – Operations and maintenance programs and priorities are aligned to achieve optimum water quality that meets or exceeds DOH requirements throughout the water system. Water quality performance is measured by the history of Maximum Contaminant Level (MCL) violations, as well as the number, frequency, and type of complaints from customers regarding water quality. Performance also is measured by the daily source/system water quality parameters being above or below the average recorded. The City's water system has an excellent record of water quality over the last 6 years; and
- **Water Production and Storage** – Operations and maintenance programs and priorities are aligned to achieve a reliable water supply measured in quantity stored to meet both demands and system pressures. The City's system has a good history of maintaining reservoir levels at or above 80 percent at all times and water system pressures meeting the system design, even during peak summer demands and fire flow conditions/testing. Performance is measured by monitoring and recording reservoir levels and system pressures, as well as tracking customer complaints for low pressure. Customers are advised of the system pressure available and what is causing the volume restrictions.

Facility or system component performance is generally reflected in one of the two areas identified above. Individual equipment or appurtenance performance is monitored for reliability throughout its life cycle. Those which do not meet the criteria are scheduled/budgeted for replacement. The Hansen IMS system will assist in tracking performance and maintenance history in the future, as well as maintenance and repair costs.

PREVENTATIVE MAINTENANCE

The City maintains a strong preventative maintenance program to maximize the useful life of all water system facilities and avoid emergency conditions wherever possible by performing system maintenance on a regularly scheduled and timely manner. A key component of the City's preventative maintenance and asset management is the Hansen IMS (Infrastructure Management System). The City invested in this program to track maintenance work on its infrastructure and create a database that includes maintenance information on water system facilities such as valves, hydrants, water mains, water meters and services, pump stations, sources/wells, treatment facilities, and storage tanks/reservoirs.

Another key change to water system operation and maintenance in recent years is the advancement of the City's GIS. The City's in-house GIS staff and Water Department personnel have worked to create a comprehensive water system map in GIS linked to the Hansen technical maintenance data for a specific location or facility. When the Hansen system generates a work order, it also has the capability (as soon as it is linked to GIS) to print a map of where the asset identified on the work order is located. This allows for City-wide integration of data and assists with a variety of inter-department functions such as scheduling capital improvements projects, budgeting, and coordinating water, sewer, street, and storm water infrastructure repairs and projects through the common GIS database.

Another key benefit of the Hansen software in conjunction with the City-wide GIS system is that it provides a mechanism for developing an inventory of all water system assets. Using the inventory of assets and historical maintenance and repair data, a "self-thinking" database can be established to prompt staff when preventative maintenance work needs to be performed. Full implementation of the program will allow the City to:

- Inventory/track all assets by ID number and physical address;
- Track labor, material, and associated costs;
- Schedule work by individual asset or group assets;
- Generate work orders for scheduled and unscheduled preventative maintenance;
- Forecast repairs and replacement part needs; and
- Project budgetary information.

FIRE HYDRANTS

There are approximately 2,900 hydrants within the water system that are maintained by the Water Department. Information such as location, size, type, feeder information, manufacturer, and number of turns for the foot valve are examples of the information that is collected for the database.

Presently, City Water personnel have the responsibility for an ongoing program of inspecting and flushing hydrants. The Water Department hires one or more Maintenance Assistants who have a goal to inspect and operate approximately one-half of the fire hydrants annually and notify the Water Distribution Supervisor of any items requiring maintenance. With the addition of the

Hansen system, the Water Department does not anticipate changing the current inspection procedures; however, it will provide the database for labor, material, and historical data.

METERS 3 INCHES AND LARGER

Large meters, sized 3 inches and 4 inches, currently undergo bi-annual testing, and all meters sized 6 inches to 10 inches are tested annually. Some large meters require additional personnel to enter the confined space and provide support during the testing. The work order generated by the Hansen system will prompt crews in advance if the meter is located within a confined space, as well as the history of repairs and accuracy profile of each meter. The City has been upgrading many of the large meters and vaults for the past 10 years, and the accuracy, reliability, and safety has been significantly improved.

WATER MAINS/DEAD-END MAINS

There are approximately 595 dead-end mains within the distribution system. Dead-end mains are flushed on a yearly basis or more frequently as required. Each dead-end main has been assigned a unique identifier within the Hansen system for better tracking of historical data. Each time the main is flushed, it is recorded in the database. After a few years (or sooner for mains that require more frequent flushing), the database will generate work orders for main flushing. Other distribution mains are flushed or cleaned on an as-needed basis.

PUMP STATIONS

All water sources and pump stations are visited on a daily basis while in operation. Well and pump data is recorded and monitored to identify any irregularities in system operation. Pumps and pump station equipment receive regular service on an hours-in-operation or lapsed time basis.

STORAGE RESERVOIRS

Daily visits to the storage reservoirs are made to check security and overall site conditions. The reservoirs are taken out of service approximately every 3 to 5 years for cleaning and are painted every 10 to 15 years or on an as-needed basis.

PRESSURE REDUCING VALVES

City-owned distribution system pressure reducing valves are inspected monthly, receive complete maintenance on an annual basis, and are rebuilt every 5 years. Maintenance for privately owned pressure reducing valves is the responsibility of the customer.

TELEMETRY

The telemetry system employs primarily electronic components that require little maintenance, other than calibration checks and battery replacement. The telemetry system is inspected annually. This includes inspecting all telemetry recording instruments and mechanical flow meters.

In addition, more frequent checks are made to monitor facilities having temporary problems. Emergency response equipment and spare parts inventory also are checked periodically.

WATERSHED INSPECTION

To assist in maintaining the integrity of the City's water supply sources, the City has a watershed inspection and wellhead protection area (WHPA) program. Under this WHPA, the watershed areas are inspected on a regular basis for any activity that may affect the water quality at the City's facilities. Should a potential issue appear, the City would proceed with the necessary testing and studies to verify or discount the concerns. Should a concern be validated, the City would take whatever steps necessary to protect the integrity of its sources, which could include both physical improvements at its sources and legal action against the polluter. The City has obtained baseline sampling results from multiple sites within its most susceptible watershed and WHPA's 1 year time of travel, for high and low aquifer level periods, as phase one of its WHPA program.

The City also has advised King County of areas under County jurisdiction that fall within the watershed area and requested consideration and cooperation of protection of the watershed in County land use planning and actual developments.

Further protection of the sources of supply is achieved by regular, contracted daily security patrol services during evening and night time hours at these sources.

PREVENTATIVE MAINTENANCE SCHEDULE

A summary of the City's water system preventative maintenance schedule is described in **Table 8-2**.

Table 8-2
Preventative Maintenance Schedule

Task	Interval						Comments
	Sources of Supply	Daily	Weekly	Monthly	Semi-Annual	Annual	
Inspect online buildings and sites, pumps, and chemical feed equipment, record flow and hour meter readings and electronic well levels, make adjustments, add chemicals, and sample and record water quality information.		X					
Exercise generators.			X				
Inspect all facilities, manually sound and record pumping and monitoring well levels. Clean buildings and piping.			X				
Inspect and exercise/test all equipment, perform scheduled PM, lubricate, and adjust equipment as necessary per manufacturers recommendations, record pump and motor voltage, amperage, and efficiency values.				X			
Inspect and test motor/pump bearings - ultrasound.						X	
Inspect and test electrical panels and motor connections - infrared.						X	
Inspect watersheds and surrounding areas - WHPA.				X			
Monitoring well levels recorded.				X			More thorough summer/winter
Grounds maintenance, mowing, and weeding.			X				Spring/Summer
Tree pruning and clearing fence lines.					X		Spring/Fall
Repaint buildings and piping.							1-5 years
Inspect/clean/test pump control valves.						X	
Rebuild pump control and flow control valves - replace all rubber parts.							Contractor (4 years)
Calibrate flow meters, level, and pressure transmitters, rebuild as necessary.						X	

Table 8-2
Preventative Maintenance Schedule (Continued)

Pump Stations	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Inspect online buildings and sites, pumps, and equipment. Record flow/hour meter and pressure readings, check Cl ₂ and pH readings.	X					
Exercise generator(s) and diesel pump(s).		X				
Inspect all facilities, clean buildings and piping.		X				
Inspect and exercise/test all equipment, perform scheduled PM, lubricate, and adjust equipment as necessary per manufacturers recommendations, record pump and motor voltage, amperage, and efficiency values.			X			
Inspect and test motor/pump bearings - ultrasound.					X	
Inspect and test electrical panels and motor connections - infrared.					X	
Inspect/clean/test pump control valves.					X	
Rebuild pump control valves - replace all rubber parts.						Contractor (4 years)
Calibrate flow meters and pressure transmitters - rebuild as necessary.					X	
Repaint buildings and piping.						1-5 years
Grounds maintenance, mowing, and weeding.		X				
Tree pruning and clearing fence lines.				X		Spring/Fall
Pressure Reducing Valves Stations and Vaults	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Inspect and clean valve stations and vaults. Record pressures and check operation.			X			
Inspect, clean, adjust, and test pressure reducing valves.					X	
Rebuild control valves - replace all rubber parts.						Contractor (4 years)

Table 8-2
Preventative Maintenance Schedule (Continued)

SCADA System	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Remote units (RTU) - Inspect and test batteries, calibration, and radio transmission.				X		
Base station and master SCADA - test auxiliary power.			X			
Clean and test/verify function of all discrete, analog, and control points from remote sites.					X	
Distribution System	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Collect representative samples Cl ₂ , NaE, and pH.	X					
Reservoir/remote sites Cl ₂ , NaE, pH, and bacteriological.	X	X	X			DOH requirement - 70 per month for bacteriological
Flush all dead-end mains.					X	More frequently when needed
Air/vacuum release valves - inspect, clean, and test.						As needed
Transmission mains (inspect and clear easements).					X	As needed
Distribution mains - leak detect program.						When leakage is above standard
Fire hydrants/hydrant valves - inspect, test, operate, and record pressures.					X	As needed or every 2 years
Distribution valves - exercise and clean out valve box.						As needed
Test 3-inch and larger meters.					X	Annual (6" and up) Bi-annual (3" and 4")
Replace 2-inch and smaller meters.						15 to 20 years or as needed
Read commercial meters.			X			
Read residential meters.						Bi-monthly
Distribution main cleaning - ongoing.						10 to 20 years or as needed
Cross-connection/backflow devices tested by Certified BAT.					x	Documentation provided to City

EQUIPMENT INVENTORY

The City maintains a full array of heavy equipment, vehicles, and supplies to maintain regular system operations, construct small system extensions and replacements, and respond to emergency conditions. Identification of routine supplies and emergency response equipment and materials has been coordinated with the City's emergency response and hazard mitigation plans, a complete vulnerability assessment, and the needs of various departments within the City. An ongoing materials list and inventory is maintained by the Water Department for in-house needs and to assist with emergency response if requested by other purveyors in the area.

CHEMICAL INVENTORY

Operation and maintenance of a public water system requires use of various chemicals for water treatment and disinfection of facilities. **Table 8-3** identifies the typical types of chemicals stored and their purpose. Chemical specifications are identified in the City's Warehouse/Purchasing agents files, the material safety data sheet (MSDS) records, and posted onsite wherever chemical agents and compounds are used for water treatment.

Table 8-3
Chemical Inventory

Chemical	Purpose/Use
Chlorine (Liquid/Gas)	Disinfection of Water Supply
Sodium Fluoride	Fluoridation of Water Supply
Sodium Hypochlorite (12.5%)	Disinfection of Water Supply
Sodium Hydroxide (25%)	pH Adjustment (Corrosion Control)
Potassium Permanganate (Dry)	Iron and Manganese Removal
Potassium Permanganate (4% Solution)	Iron and Manganese Removal

WATER QUALITY MONITORING PROGRAM

Each of the City's water supply sources currently is classified as groundwater. The City is conducting an extensive WHPA program to serve as an early detection of possible aquifer contamination. The program involves monitoring from selected wells within the 1 year, 5 year, and 10 year zones of influence for the sources most susceptible to contamination: Clark Springs; Kent Springs; and Armstrong Springs.

The current quality of the City's water supply is excellent, with only minor secondary contaminant concerns. Secondary contaminants are classified by the U.S. Environmental Protection Agency (EPA) as aesthetic concerns and not a threat to human health. These contaminants are primarily iron and manganese, which are treated by aeration and dilution for the Seven Oaks (Soos Creek) and Garrison well sites, and oxidation followed by filtration for the 208th and 212th well sites. The City chlorinates its water supply for public health protection from bacteriological pathogens. The City also fluoridates the water supply for dental health benefits for consumers. The City's water supply also is moderately hard, with a relatively low pH;

consequently, it is slightly corrosive to plumbing fixtures. In June 2012, the City completed and put online a corrosion control facility at Guiberson Reservoir to adjust the pH of Kent Springs water and Kent Springs water when blending with Tacoma water to make it less corrosive. The 212th Treatment Plant adjusts the pH of its product water to a pH of 8.2 whenever it is operating. A summary of the City's water treatment is shown in [Table 8-4](#).

As discussed in [Chapter 6](#), the City maintains compliance with the regulations set forth by the EPA's Safe Drinking Water Act (SDWA); Title 40 Code of Federal Regulations (CFR) Part 141 National Primary Drinking Water Regulations; and DOH Drinking Water Regulations for Group A, Public Water Systems, Chapter 246-290 WAC.

Table 8-4
Water Treatment

Source	Type of Treatment	Comments
Clark Springs	Chlorination, fluoridation, and pH adjustment	None
Kent Springs	Chlorination, fluoridation, and pH adjustment	None
East Hill Well	Chlorination, fluoridation, and pH adjustment	None
Seven Oaks (Soos Creek Well)	Chlorination, fluoridation	Blended with Clark Springs or Kent Springs
Armstrong Springs Wells #1 and #2	Chlorination, fluoridation	Blended with Clark Springs or Kent Springs
Garrison Well	Chlorination, fluoridation	Blended with treated water at 6 MG #2 Reservoir
O'Brien Well	Chlorination, fluoridation	None
208th Well and 212th Wells #1, #2, and #3	Chlorination, fluoridation, filtration, and pH adjustment	208th and 212th Wells treated together at the 212th Street Treatment Plant

[Table 8-5](#) includes a partial list of analytical laboratories used by the City for routine and specific analysis of drinking water samples. These laboratories are EPA and DOH certified for compliance with Department of Health regulations. The City's current water quality monitoring program is included in [Appendix I](#).

Table 8-5
Water Quality Analytical Laboratories
(State of Washington Approved)

Laboratory	Phone Number	Address	Analysis Performed
Water Management Labs Inc.	(253) 531-3121	1515 80th Street E Tacoma, WA 98404	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis
Edge Analytical Laboratories	(800) 755-9295	1620 S Walnut Street Burlington, WA 98233	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis UCMR II
Washington DOH Public Health Laboratories	(206) 418-5400	1610 NE 150th Street Shoreline, WA 98155	Maximum total Trihalomethane potential (MTTPs), radionuclides, general organic chemistry
AmTest Laboratories	(425) 885-1664	13600 NE 126th Place, Suite C Kirkland, WA 98034	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis

PUBLIC NOTIFICATION

In accordance with the requirements of the EPA, the City prepares an annual water quality report sometimes referred to as a Consumer Confidence Report. A copy of this report is included in [Appendix K](#).

In the event of an issue with the water supply, the City has established procedures for various levels of emergency, including suspected water quality issues, known contaminants identified in the water system, boil water notifications, and water supply interruption or shortage. The exact procedures and language identified for each potential water quality or quantity emergency is included in the City's Coliform Monitoring Plan, Cross-Connection Control Program, Water Shortage Response Plan, or Emergency Response Plan, as appropriate. In general, the City is fully prepared for the following public notification measures. Please note that these general methods of notification are intended only as a summary of complete procedures and language identified in the aforementioned plans and procedures.

- Newspaper Notices
- Direct Mail Notice or Hand Delivery to all Consumers or Customers in a Specific Area of the System
- Posted Notice
- Notice to Radio and Television Stations
- Notices to New Billing Units or New Hookups
- City of Kent social media sites

EMERGENCY RESPONSE

All water supply systems are subject to damage and interruption from unusual emergency events. The City's Water Department has participated in City-wide emergency response planning and has a detailed program for responding to a variety of emergency conditions. The details of that

emergency response program are classified confidential for the protection of the system, health and safety of system customers, and privacy of water system personnel. The following provides a general overview of key activities that have been evaluated and/or are in place.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

The City maintains information that identifies, in order (based on DOH certification level and experience), water system personnel responsible for making decisions in specific emergency situations. Job titles and phone numbers (work and home) are included. The Kent Police Department (phone 253-856-5800) has a current list of all phone numbers on file and available 24 hours a day, as well as procedures for emergency callout of the proper personnel.

NOTIFICATION PROCEDURES

A Boil Water Notice may be approved or distributed by the City. In all cases the Public Works Director, City Operations Manager, and/or the Mayor are to be notified of any action taken as soon as possible.

SEISMIC VULNERABILITY ANALYSIS

Kennedy Jenks completed a seismic vulnerability assessment of the City's water system in 2017. The objectives of the study were to determine the potential for damage, disruption of services, and injury or loss of life (life-safety) due to an earthquake; and to develop preliminary mitigation recommendations and estimated construction costs. The City has implemented the recommendations of the vulnerability analysis in its budgeting and Capital Improvement Program (CIP) ([Chapter 9](#)). Water system component vulnerability was assessed in the following areas: major fire; earthquake; chlorine gas; mechanical failure; bomb; power; employee accident/illness; sub-zero weather; flooding; and windstorm. The study did not identify any system components as "very vulnerable." However, the analysis did put forth recommendations for corrective action on some system components. While key recommendations for security improvements have been accomplished, this is considered an ongoing expense to the City, with improvements accomplished as technology allows and system components require.

Other system vulnerability upgrades have been identified in consultant reports and summarized in the CIP contained in [Chapter 9](#). The identification and addition of all system improvements, however, will increase the reliability of the water system in the event of an emergency and extend the useful life of the system.

EMERGENCY PREPAREDNESS

Table 8-6
Preparation Common to All Emergencies

Personnel	Advise personnel to arrange for safety of families in advance.
	Prepare emergency schedule and brief personnel.
	Put all personnel on emergency status.
	Strategically locate and station crews.
Facilities	Check vehicles, auxiliary electrical power, and pumping units. A. Sufficient fuel. B. Operation of emergency power/battery operated lights. C. Operation of vehicles.
	Check emergency communication equipment for readiness.
	Maintain emergency rations, water, clothing, and bedding at the maintenance shops sufficient for 72 hours.
	Secure equipment and supplies in exposed areas; secure buildings; install storm shutters, if available and appropriate.
Materials	Review possible repair materials for local purchase of items on short notice in an emergency.
	Arrange with local suppliers and nearby utilities for access to stored chemicals, tools, repair parts, etc., which may be required immediately after the disaster.
	Determine the need to relocate certain materials to outlying sites.

CONDITIONS OF SERVICE

Throughout the year, three distinctive conditions of service (green, yellow, or red) can exist. The conditions are explained below. The Water System Manager is responsible for making all changes in the condition or service, with the approval of the Public Works Director.

1. Condition Green – Normal water use. Notification of Water Department Control Center is required for all unusual or excessive water/hydrant use.
2. Condition Yellow – Caution is necessary with all water/hydrant use. All inspections/water main flushing and/or hydrant flows must be cleared through the Water Department Control Center in advance.
3. Condition Red –
 - Level #1 – No hydrant use. No inspection water flows. Contact Water Department Control Center on all emergency hydrant use or water flows.

- Level #2 – Same as Level #1 except public irrigation is authorized on alternate days based on street address (odd/even), ONLY.
- Level #3 – Same as Level #1 except that public irrigation is prohibited.

PUBLIC NOTIFICATIONS

Many of the City's water quality monitoring and emergency response plans call for notification of the public of emergency conditions and of required demand curtailment measures. Sample announcements are presented here in increasing order of severity. The City should contact newspapers and several local radio and television stations, which broadcast in the service area, to make prior arrangements concerning emergency announcements.

Sample I

For Immediate Release:

The City of Kent is experiencing unusually high water demand and is having difficulty maintaining adequate reservoir reserves. Residents of the City are requested to reduce water consumption and to avoid wasting water wherever possible. It will be particularly helpful if homeowners will make every effort to reduce lawn irrigation. The problem is expected to be temporary in nature, and a public announcement will be made when normal water consumption can be resumed.

Sample II

For Immediate Release:

The City of Kent is experiencing a major loss of its water production capacity. The City's customers are directed to stop all irrigation and to make every effort to conserve potable water. Failure to do so may result in the application of fines of up to \$50/day, according to City ordinance #2227. The City is doing everything possible to correct the situation, and will make a public announcement as soon as the problem has been rectified.

Sample III

For Immediate Release:

This is a Community Emergency Announcement. The City of Kent has experienced a major loss of its water production capacity, and, therefore, is unable to maintain normal water deliveries. It is mandatory that all irrigation, industrial, and commercial use be discontinued. Water must be conserved for sanitary and potable use only. Your cooperation is urgently requested. Failure to eliminate unessential uses of water may result in the application of fines of up to \$50/day, according to City ordinance #2227. The City is doing everything possible to restore the water system to normal operations. You will be notified of any change in the situation. Note: repeat the above message.

Sample IV

For immediate Release:

The City of Kent has experienced a total loss of its water production capacity; as a result, the water mains have been shut off and normal water deliveries have been discontinued. The City

has made arrangements to deliver water by tanker truck or bottled water to residential areas for potable and sanitary uses only.

When picking up water at the tank truck locations, please bring your own clean containers. The City is doing everything possible to resume normal water service and will notify you as soon as water service has been restored.

State law, WAC 248-54-750, Reporting and Public Notification, clearly outlines the City's responsibilities for both oral and written communication with water users in situations that may be caused by emergencies. All staff with authority for public announcements should be familiar with these regulations.

In addition to public announcements, communication with emergency services is vital.

CUSTOMER COMPLAINT RESPONSE PROGRAM

The City has adopted the following policy and procedures for taking and responding to complaints/inquiries.

To contact the Water Department, citizens contact the Public Works Operations Department through the public number, which is (253) 856-5600. The phone is operated by City employees Monday through Friday (except holidays) between the hours of 7:30 a.m. and 4:00 p.m. During non-working hours, the phones are answered by a voice message system. In the case of emergencies during non-working hours, the calls are forwarded to the City Police Department who contacts Water Department employees on a callback list, the employees on standby, or the Water System Manager.

During standard working hours, the individual receiving the call shall record all of the pertinent information (i.e., name, address, location of the problem, date, phone number, and the nature of the call) on a complaint/inquiry form in the WebQA System for assignment and tracking. Each form has a unique identifying number to assist in tracking. Once all the pertinent information is recorded, a copy of the form is given to the corresponding supervisor or System Manager.

Field Supervisors/System Managers are responsible for contacting the citizen as soon as possible within a 24 hour period. After the citizen has been contacted and the situation assessed, the response given to the citizen is recorded in the WebQA database.

COMPLAINT RESPONSE

Following are the established procedures for responding to the most common complaints/inquiries.

High Chlorine – Contact customer by phone, explain chlorination practices and monitoring, follow up with visit to customer location (if necessary) and perform field analysis. Explain results to customer and give advice on procedures to lessen chlorine tastes and odors if normal levels have become objectionable to the customer.

Stains on Plumbing Fixtures – Contact customer by phone, determine type of stain (i.e., result of type of plumbing), explain water quality, and need to eliminate leakage that is leaving stain.

Request for Water Quality Results – Contact customer by phone to determine type of result they are looking for or reason for needing the information. Follow up with mail, email, or fax of results needed by customer.

Inquiry on Fluoride – Contact customer by phone. Generally, customer inquiry is “do we fluoridate the water?” Check customer address to verify City of Kent customer, and inform them of fluoride concentration.

Bad Tasting/Smelling Water – Contact customer by phone to determine type of smell or taste causing concern. Set up site visit to check water quality; and check chlorine residuals to determine quality of water. Meet with customer to review concerns, ways to eliminate or lessen concerns (i.e., flushing, refrigeration), and dispatch distribution crews for main flushing if necessary.

“Ill Because of Water” – Contact customer by phone and get information on the reason for this concern and schedule an appointment for meeting with the customer. Meet with customer and take chlorine residual to determine possibility of high chlorine demand; determine necessity of bacteriological sampling and sample if necessary with sample going to certified laboratory for analysis. Contact customer with results and inform them of physician responsibility to report suspected waterborne illness to local Health Department and the fact that the Health Department is not reporting a problem; advise customer to follow up with a doctor if necessary. If concern is related to other causes, such as minerals or chlorine, City staff inform the customer of water quality and methods for lessening exposure to these areas. If customer is still concerned, suggestion may be made to drink bottled water.

Inquiry of Lead Content – Inform customer of the absence of lead in the City water supply, but explain the potential for lead in plumbing piping and fixtures. Explain lead/copper monitoring program, City water quality characteristics, corrosion control facilities, and ways to eliminate exposure (i.e., flushing standing water, using cold water for cooking and drinking); provide customers with lead information packets.

Specks of Material in Water – Call customer and determine type of specks. Schedule an appointment with customer for determination of material. If it is related to the customers plumbing, suggest ways to clear. If related to distribution system, dispatch distribution crew for main flushing and determine cause.

Rusty Water – Call customer and determine if problem is internal to building or if it is from distribution system. If internal, suggest ways to clear problem. If external, dispatch distribution crew for main flushing and determine cause (i.e., dead-end main, contractor activity, or water system surges).

PROCEDURES FOR RECORD REPORTING TO DOH

For coliform monitoring and chemical analysis of water for compliance issues, the contracted certified laboratory sends a copy of the results to the City and a copy of the results directly to DOH. The City maintains water quality analysis results and provides these results to DOH upon request. For special programs such as lead/copper rule or synthetic organic susceptibility, the City mails results directly to DOH Drinking Water offices in Olympia.

Reporting to the Department of Health

For coliform monitoring, any instance of a positive coliform present analysis requires the City to follow the procedures outlined in the Coliform Monitoring Plan.

RECORDKEEPING AND REPORTING

DOH has enacted regulations for recordkeeping and reporting that may be found in WAC 246-290-480. The regulations identify recordkeeping and reporting procedures for operations and water quality testing. Records shall be kept for chlorine residual and other information as specified by DOH. DOH requires retention of critical records dealing with facilities and water quality issues as summarized below.

- Bacteriological analysis results: 5 years.
- Chemical analysis results: for as long as the system is in operation.
- Daily source meter readings: 10 years.
- Other records of operation and analyses as may be required by DOH: 3 years.
- Documentation of actions to correct violations of primary drinking water standards: 3 years after last corrective action.
- Records of sanitary surveys: 10 years.
- Project reports, construction documents and drawings, inspection reports, and approvals: life of the facility.
- Construction completion reports: life of the facility.

Table 8-7
Record Keeping and Reporting

Type of Record	Storage Location			Length of Retention
	Records Room	Supervisor Office	Electronic	
Customer Complaints	X	X	X	Permanent
DOH Water Facilities Inventory (WFI)		X	X	Permanent
Construction Completion Reports	X	X	X	Permanent
Ground Water Under Direct Surface Influence (GWUI)	X	X	X	Permanent
Wellhead Protection Plan Monitoring (WHPP)		X	X	Permanent
Source Production	X	X	X	Permanent
Water Quality Analysis	X	X	X	Permanent
Coliform Monitoring	X	X	X	Permanent
Fluoride/Chlorine	X	X	X	Permanent
Inorganics (IOCs)	X	X	X	Permanent
Volatile Organics (VOCs)	X	X	X	Permanent
Synthetic Organics (SOCs)		X	X	Permanent
Trihalomethanes (THMs)	X	X	X	Permanent
Radionuclides		X	X	Permanent
Lead/Copper Rule (LCR) Monitoring		X	X	Permanent
Water Department Time Books/Journals/Log Books	X	X		Permanent

The most recent sanitary survey of the City's water system by DOH was conducted in December 2016, and no major deficiencies were found. DOH found that the City's water system is in good sanitary condition, and that the water system is being operated and managed in a diligent manner. DOH also determined that the City has a functional operations and maintenance group with routine tasks documented and followed, has added additional security measures, is improving its telemetry system, offers reliability with the capability to move flow between zones and utilize different sources, and has auxiliary power available. The City continues to stay in compliance with its water quality sampling requirements.

It was very evident to DOH that City staff take their responsibilities seriously and are dedicated toward delivering safe and reliable drinking water to all customers.